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A considerable number of the double stars disclosed by occultations will be too close to be confirmed by the telescope, and will therefore form a class intermediate to the visual double and the spectroscopic binary.

The occultations of any spectroscopic binaries within the zodiac should be watched for and widely observed.

A series of occultations of *α Virginis* is now commencing. As *α Virginis* is a well-known spectroscopic binary, these occultations demand special attention.

A point in favour of occultations is that they can be observed very well indeed with telescopes of moderate size.

On some future occasion it is purposed to make a collection of all occultations of the above classes that have been recorded.

Cape of Good Hope: 1901 March 5.

Meteoric Showers from the Region of α–β Persei and η Aurigæ.

By W. F. Denning.

A very brilliant meteor was observed at various places in the south of England on 1901 March 6, $7^h\ 25^m$. Descriptions of its appearance and path have been received from Denmead, Hants; Clapham Common, London, and Epsom Common; Isle of Wight; Lewes, Torquay, Yeovil, &c. Several of the observers give the direction of flight as straight from *Nova Persei*, and there is no doubt that the radiant point was at or closely contiguous to $51° + 43°$. There is a well-known, long-enduring shower from about 2° W. of this point, and it forms No. XLIII. in the "General Catalogue of Radiants" (*Memoirs R.A.S.*, vol. liii.). At Denmead, Hants, the meteor as it passed under *Orion's* belt appeared like a ball of fire, and from it three small fragments were detached, one being greenish and two, close together, bright red. At Lewes the meteor is described as being magnificently brilliant and of a greenish colour. "It emerged midway between the *Pleiades* and constellation *Perseus*, and after describing a parabola towards the W. it disappeared, leaving a fiery train in its wake." Miss L. M. Milner, of Torquay, says the meteor was directed straight from the new star and fell towards E. through the constellations of *Lynx* and *Leo*. It was orange colour at first, but developed into a brilliant green; then burst into separate green particles and died out. At Yeovil the meteor was seen in *Gemini*, and passed almost vertically downwards. A comparison of the various observations shows that the object fell from about eighty-four to twenty-seven miles above the English Channel fifteen miles south of St. Alban's Head, Dorset, and

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St. Catherine's Point, Isle of Wight. The motion was slow, from W. to E., along a path of about sixty-six miles, but these results are only approximate.

A fireball which brilliantly illuminated the sky at several places was seen at Slough, Plymouth, Leicester, &c., on 1900 November 27 $11^h\ 10^m$. At the former place Professor A. S. Herschel recorded the apparent path as from $338^\circ+12^\circ$ to $328^\circ+2^\circ$, and the motion was very slow. The radiant point was at about $47^\circ+45^\circ$, and in nearly the same position as that of the fireball of March 6 previously referred to. The height was from fifty-seven to seventeen miles over Ilfracombe and the Bristol Channel.

On 1899 September 2 $12^h\ 5^m$ a meteor brighter than *Venus* was seen by the writer at Bristol and by Mr. Ivo F. H. C. Gregg at Malvern. The radiant from the pair of observations was at $46^\circ+42^\circ$, and the height of the object eighty-six to sixty miles over Shipston and Tewkesbury, Gloucestershire.

Several other very fine meteors—notably those of 1896 April 12 $8^h\ 6^m$ and 1894 April 22 $7^h\ 36^m$—have diverged from the same position, and Professor Herschel found the radiant of a shooting star recorded on 1865 November 12 at $50^\circ+42^\circ$. Including the latter with seven of my own determinations from duplicate or multiple observations of individual meteors, we have the following list :—

Date.			α	δ	
1901	March	6	51°	$+43^\circ$	Fireball.
1896	April	12	50	+42	,,
1894		22	48	+44	,,
1895	Aug.	7	45	+47	Shooting star.
1899		14	52	+46	,,
1899	Sept.	2	46	+42	Fireball.
1865	Nov.	12	50	+42	Shooting star.
1900		27	47	+45	Fireball.

The mean of these positions is at $48\frac{1}{2}^\circ+44^\circ$.

A brilliant meteor seen at Bristol and Cooper's Hill, Kent, on 1875 March 9, was apparently from the same radiant.

There is a well-defined and tolerably rich shower, or succession of showers, from this centre during the last six months of the year. I have frequently recognised it during the last twenty-five years, and have secured the following independent values for the radiant :—

Date.			α	δ	Meteors.	
			°	°		
1876–87	Feb.	23–Mar. 12	47	+45	5	V. S.
1877	July	20	47	+45	5	R. K.
1884		23–25	48	+43	15	R. K.
1886	Aug.	2–10	48	+43	10	R. K.
1877		3–16	46	+45	6	R. K.
1888–96		5–14	48	+44	6	R. K.
1893		8–16	48	+44	11	R. K.
1899		13–17	47	+44	6	R. K.
1884		19–21	46	+44	4	R. K.
1879		21–23	46	+47	9	R. K.
1900		24–Sept. 2	46	+43	5	R. K.
1887		30	46	+43	4	R. K.
1885	Sept.	15	48	+44	6	R. K.
1877		15–16	47	+45	7	R. K.
1886		22–30	48	+44	6	R. K.
1877	Oct.	3–13	46	+45	14	R.
1887		17–24	47	+44	6	R.
1879		20	45	+46	6	R.
1900		23–27	47	+43	6	S.
1874–99	Nov.	10–15	48	+43	10	S.
1876–87		27–Dec. 8	48	+42	10	S.
1874–88	Dec.	28–Jan. 11	47	+44	7	V. S.

Abbreviations in last column are R. rapid, S. slow, K. streak, V. very.

The average position from the twenty-two radiants is at 47·0° + 44·1°, which presents a satisfactory agreement with that derived from the eight doubly observed meteors before alluded to. I believe that, allowing for precession and giving extra weight to the most accurate observations, the centre of radiation of this stream is as nearly as possible $48° + 43\frac{1}{2}°$.

During the thirty-three nights from July 16 to August 17 in various years since 1875 I have recorded sixty-six meteors from this shower, and have seen many others the paths of which were not registered. In July, August, and September the flights are rapid and usually marked with streaks; in October the motion is less rapid, and the streaks are absent. In November and succeeding winter months the meteors travel slowly, and sometimes very slowly, with trains.

The position of the radiant closely W. of *Nova Persei* is interesting, apart from the fact that it has furnished several recent fireballs and that the shower is apparently one having a very extended duration.

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About 20° E. there is another similar radiant (G. C. lxv.) at the star η *Aurigæ* (74° + 41°). Professor Herschel and several other observers saw a fine meteor from this centre on 1901 February 13, falling from fifty-six to twenty-six miles over Pembrokeshire. The same apparent radiant gave us the brilliant fireball of 1896 September 10. During the months August to December in various years I noticed this stream on many occasions, and having arranged the observations into groups and reprojected all the paths, find the following radiants :—

Date.		Night.	Radiant. α	δ	
			°	°	
Aug.	7–22	16	73	+41	16 meteors.
Sept.	12–22	11	74	+42	28 „
	26–Oct. 2	7	73	+41	15 „
Oct.	13–25	13	74	+41	10 „
	31–Nov. 17	18	73	+42	15 „
Nov.	28–Dec. 13	16	74	+41	10 „

The shower is also a conspicuous one, and often yields brilliant fireballs between about February 5–15, though I have myself seen but little of it at that period, having made very few observations in the month of February. From Zezioli's and a number of other meteor-paths observed in Italy in 1869–72 I found a good radiant at 74° + 43° (twenty-two meteors) for February 5–10. Greg and Herschel give a radiant at 73° + 40° for February 9–17. Schiaparelli found one at 74° + 48° from Zezioli's observations on 1868 February 16, and Heis gave 80° + 40°, February 16–28. For March 9–27 Greg derived a radiant at 74° + 47° from Zezioli's meteors, while on 1865 April 29 Professor Herschel found the radiant of a doubly observed fireball at 75° + 47°. This shower of *Aurigids* and that of the α–β *Perseids* deserve special notice on account of their persistency or frequent repetition, and for the very brilliant fireballs which they occasionally discharge. And it is a curious circumstance that the latter sometimes make their apparitions at times when there are few, if any, ordinary shooting stars emanating from the same radiants.

Bishopston, Bristol :
1901 *March* 24.